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ENGINEERING REPORT:

**APPLICATION FOR FACILITIES CHANGES
KRFX-FM CHANNEL 278C, 103.5 MHz
DENVER, CO**

JACOR BROADCASTING OF COLORADO, INC.

4/2003

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1. Purpose of Application

This Engineering Report is part of an application for facilities changes for FM station KRFX at Denver, Colorado, by Jacor Broadcasting of Colorado, Inc. The proposed operation will be on FM Channel 278C (103.5 MHz) with a maximum lobe effective radiated power of 100 kilowatts (20.00 dBk) at an antenna height above average terrain of 487 meters. The ERP specified is the maximum for Class C facilities at this antenna height, as calculated in accordance with the Commission's Rules.

2. Allocation Considerations

The attached spacing study shows that the proposed operation meets the co-channel and adjacent channel spacing requirements for Class C stations as prescribed in §73.207 of the Commission's Rules. Please see Exhibit B-16A for a discussion of an apparent short-spacing to the proposed allotment of Channel 279CØ/C1 at Akron, Colorado.

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SEARCH PARAMETERS FM Database Date: 030410

Channel: 278C 103.5 MHz Page 1

Latitude: 39 43 59

Longitude: 105 14 10

Safety Zone: 32 km

Job Title: KRFX 278C DENVER

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KARS-FM	LARAMIE		275C1	100.000	40-52-37	343.1	132.89	105
CP MOD	WY	BMPH-020926ABK	102.9	248.0	105-41-44		27.89	CLEAR
K276BJ	BOULDER		276D	0.070	40-04-19	345.1	38.95	0
LIC	CO	BLFT-830214MC	103.1	769.0	105-21-14		0.00	TRANS
RSV	PARKER		276C	0.000	39-26-08	107.4	108.37	105
	CO	RM-9890	103.1	0.0	104-02-05		3.37	CLOSE
KAVD	PARKER		276C	100.000	39-26-15	106.8	111.54	105
APP	CO	BPH-011207AAM	103.1	585.0	103-59-43		6.54	CLOSE
ADD	BRIDGEPORT		277C	0.000	41-50-23	26.4	262.45	241
	NE	RM-vm128	103.3	0.0	103-49-36		21.45	CLEAR
K278AG	BASALT		278D	0.010	39-21-10	255.8	165.83	0
LIC	CO	BLFT-980217TC	103.5	480.0	107-06-06		0.00	TRANS
KRFX	DENVER		278C	100.000	39-43-50	165.6	0.29	290
LIC	CO	BLH-4823	103.5	320.0	105-14-07		-289.71	SHORT
K280DP	REDSTONE		278D	0.010	39-14-20	252.8	179.42	0
APP	CO	BPFT-030205AAX	103.5	619.0	107-13-18		0.00	TRANS
ADD	AKRON		279C1	0.000	40-03-28	78.7	198.00	209
	CO	RM-10630	103.7	0.0	102-57-35		-11.00	SHORT
NOTE: PLEASE SEE ATTACHED EXHIBIT FOR DISCUSSION OF THIS APPARENT SHORT-SPACING								
ADD	AKRON		279C0	0.000	40-09-27	76.1	208.12	220
	CO	RM-10630	103.7	0.0	102-51-51		-11.88	SHORT
NOTE: PLEASE SEE ATTACHED EXHIBIT FOR DISCUSSION OF THIS APPARENT SHORT-SPACING								
NEW-T	COLORADO SPRINGS		280D	0.120	38-46-27	163.0	111.29	0
LIC	CO	BLFT-286	103.9	384.0	104-51-36		0.00	TRANS

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SEARCH PARAMETERS                               FM Database Date: 030410
Channel: 278C 103.5 MHz                         Page 2
Latitude: 39 43 59
Longitude: 105 14 10
Safety Zone: 32 km
Job Title: KRFX 278C DENVER
    
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Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
K280DZ LIC	LEADVILLE CO	BLFT-930218TE	280D 103.9	0.050 DA 947.0	39-15-54 106-10-54	237.6	96.52 0.00	0 TRANS
KYZX LIC	PUEBLO WEST CO	BLH-990428KE	280C2 103.9	1.750 658.0	38-44-40 104-51-41	163.5 SS	114.42 9.42	105 CLOSE

44444 END OF FM SPACING STUDY FOR CHANNEL 278 44444

3. Facilities Proposed

a. Facility Description

The proposed operation will be on Channel 278C (103.5 MHz) with a maximum lobe effective radiated power of 100 kilowatts. Operation is proposed with an 8-level circularly-polarized directional panel antenna (0.81 wavelength spacing at the KRFX frequency). The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1033691.

b. Blanketing Contour

The 115 dBu contour for the proposed facilities extends 3.9 kilometers from the tower, based on the calculation methodology shown in §73.318 of the Commission's Rules. Much of the area within the blanketing contour is populated. The height of the proposed antenna above ground and its vertical radiation characteristics should mitigate any adverse effects to nearby residents or other communications facilities. If such adverse effects occur, the applicant will be responsible for their amelioration as prescribed in §73.318, including receiver-induced intermodulation to facilities in existence or authorized or receivers in use prior to grant of this application.

c. HAAT Calculation

The proposed operation is at the Lookout Mountain transmitter site east of Denver, Colorado. Consistent with prior precedent, the average terrain value calculation excludes the four radials which extend primarily over the Rocky Mountains. The Commission has long recognized this method of calculating HAAT in previous cases involving stations in the Denver area, and recently acknowledged the continued need to prevent improper skewing of the antenna HAAT values of stations in the area.¹

Precise average terrain figures for the proposed facility are provided in the attached table. The applicant respectfully requests a waiver of §73.313(d) of the Commission's Rules to permit exclusion of the terrain data on the four radials extending over the Rocky Mountains from the average terrain calculation for this facility.

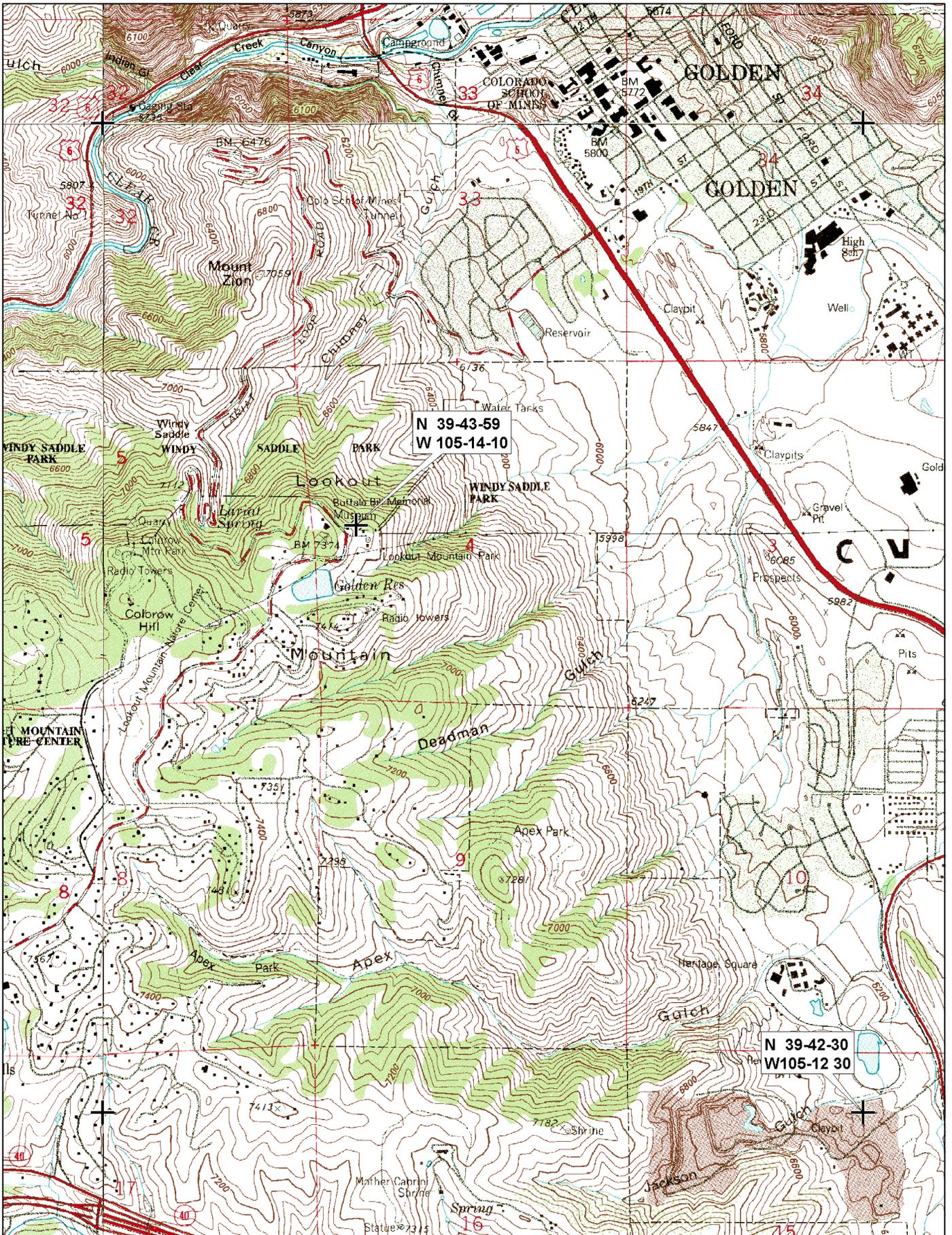
¹Second Report and Order in MM Docket No. 98-93, *Streamlining of Radio Technical Rules in Parts 73 and 74 of the Commission's Rules*, released November 1, 2000.

AVERAGE TERRAIN CALCULATION

Azimuth (degrees True)	Average Terrain
0	1848.5 m
45	1715.1 m
90	1713.4 m
135	1799.7 m
180*	2172.0 m
225*	2277.0 m
270*	2215.1 m
315*	2405.2 m

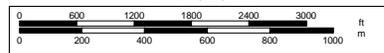
*Radial extends over the Rocky Mountains and is excluded from the average terrain calculation

Radiation Center 2256 meters AMSL
Average Terrain 1769 meters
HAAT 487 meters

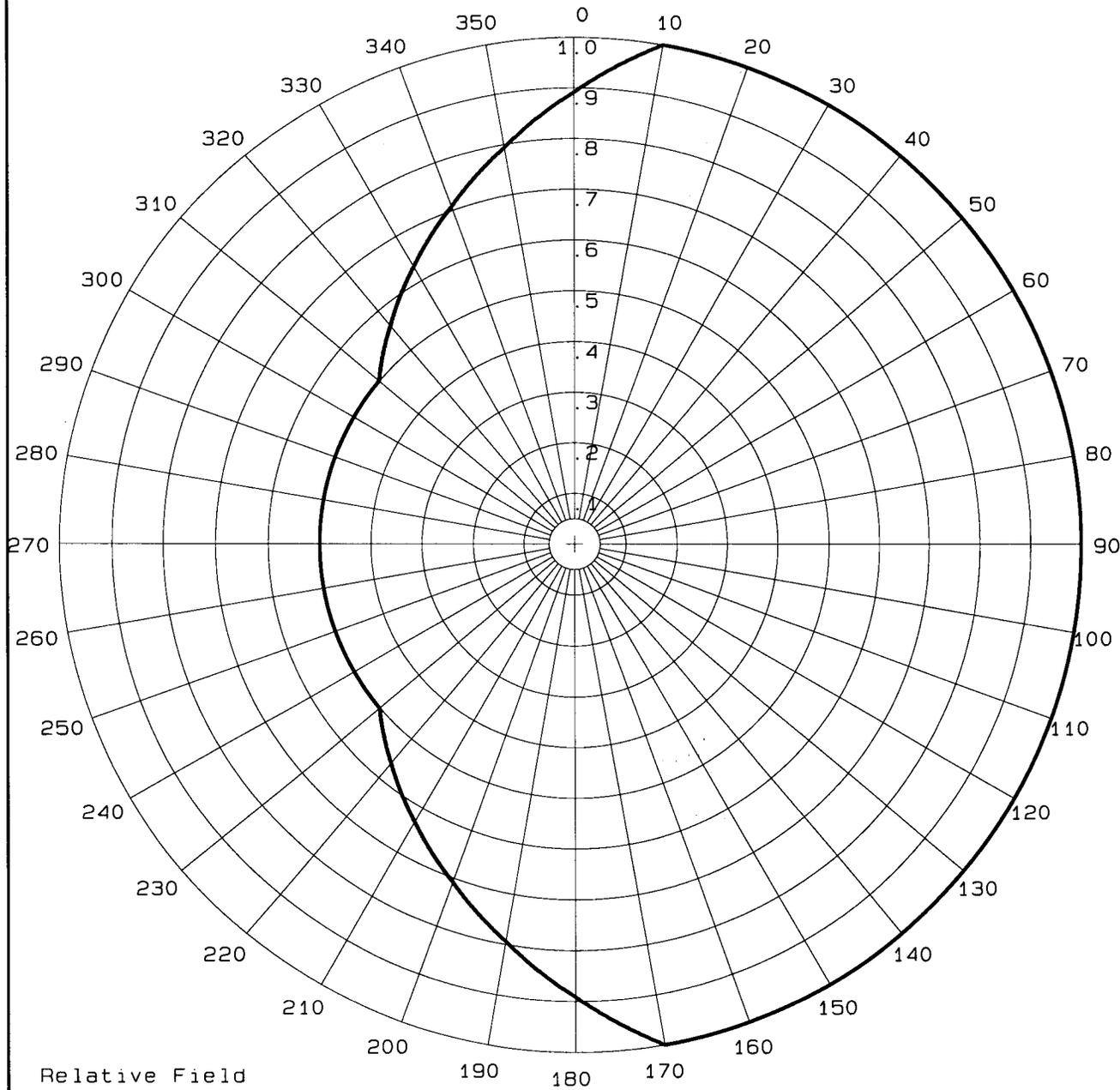


© 2002 DeLorme. XMap® 3.5. Data copyright of content owner.
 Zoom Level: 13-1 Datum: NAD27

Scale 1 : 24,000
 1" = 610 m

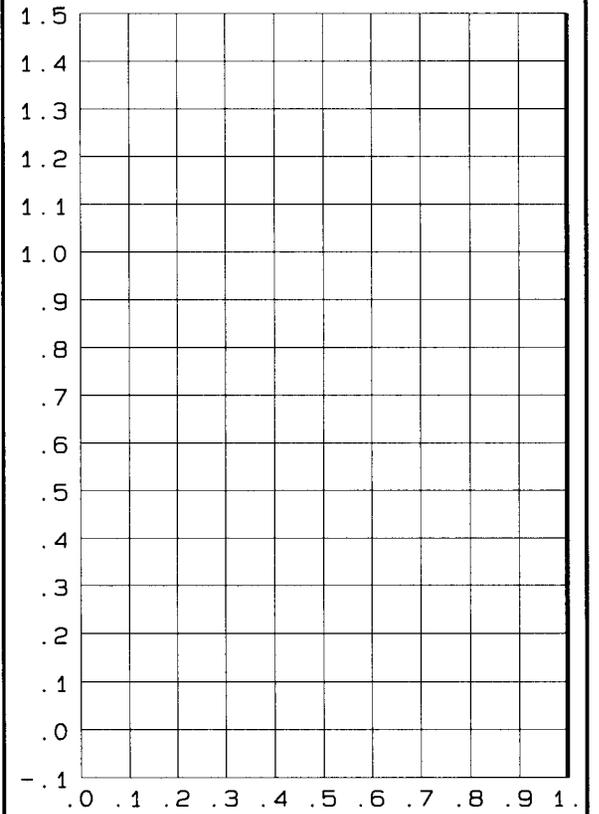


HORIZONTAL PLANE PATTERN



VERTICAL PLANE PATTERN

Azimuth: .0



Pattern file: D:\KRFX\KRFXENV.PAT

ELECTRONICS RESEARCH, INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610

FIGURE 4B

-----THEORETICAL-----
VERTICAL PLANE RELATIVE FIELD
8 LEVELS OF TYPE 1080 ELEMENTS
+0.00 DEGREE(S) BEAM TILT
0 PERCENT FIRST NULL FILL
0 PERCENT SECOND NULL FILL

AUGUST 4, 2000

103.5 MHz

BAY SPACING
92.00 INCHES
(.8068 WAVELENGTH)

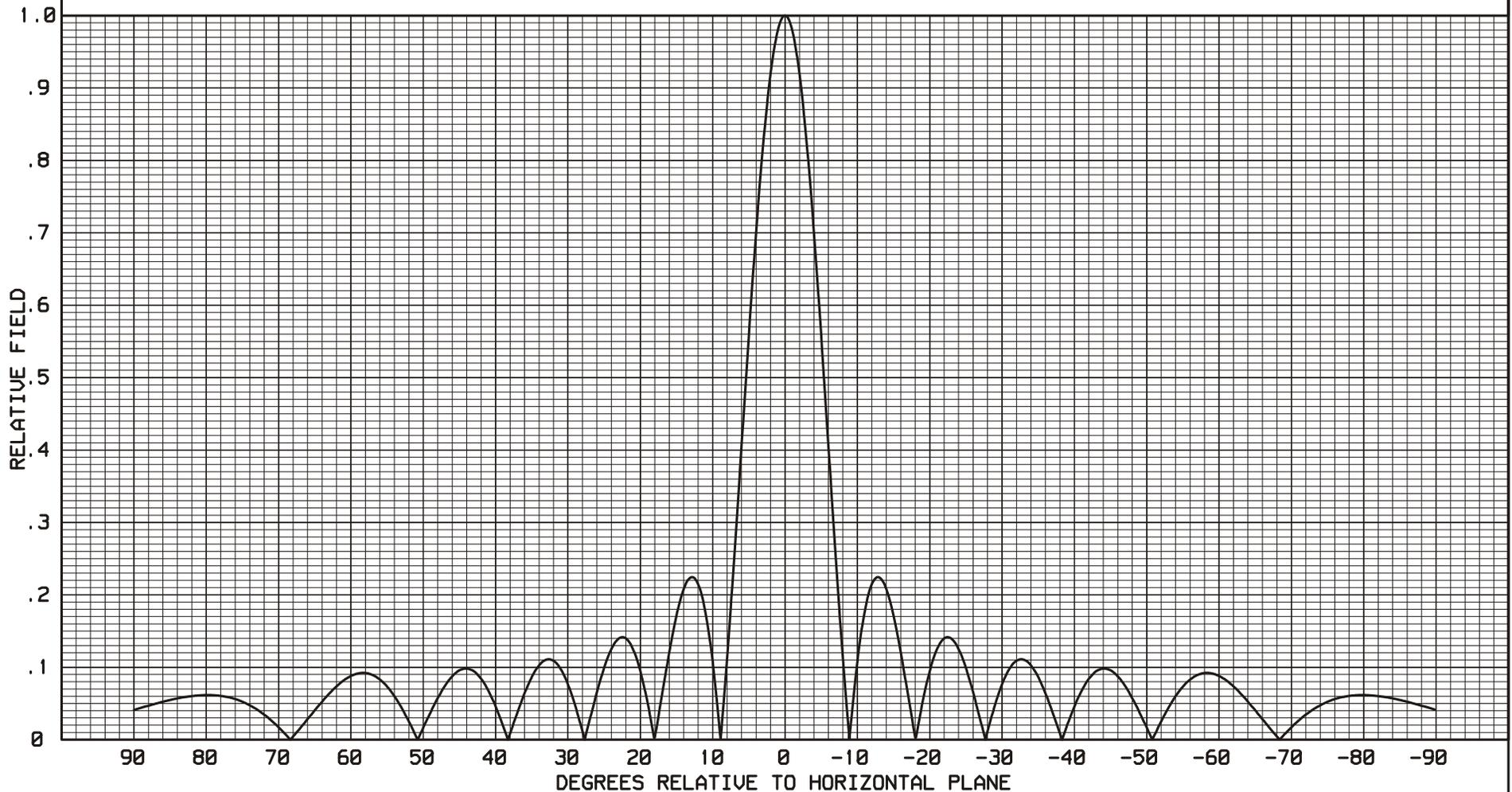


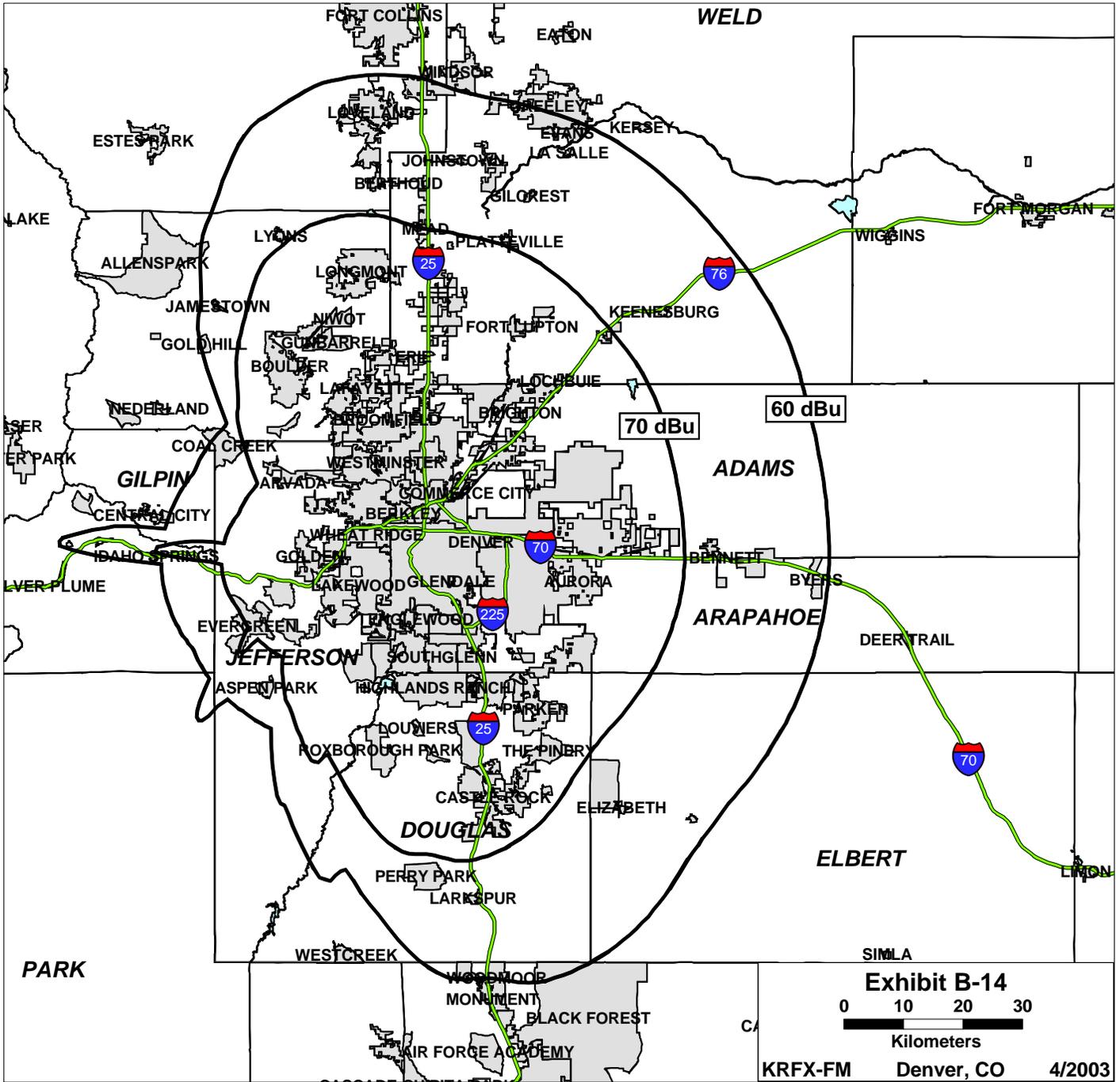
Exhibit B-12C
Directional Antenna Statement
KRFX-FM 278C Denver, Colorado

A directional antenna is proposed to allow combined operation with station KFMD, to limit radiation over the Table Mountain Radio Receiving Zone, and to avoid wasting energy over the Rocky Mountains. A waiver to permit use of a directional antenna in this instance is explicitly requested, if required. It should be noted that this directional antenna is not necessary for allocation purposes, and therefore will not be subject to the 85% RMS requirement.

The proposed antenna is an 8-level ERI panel antenna, which will be side mounted on an existing tower. The characteristics of the tower and intended orientation of the antenna will be specified by the manufacturer as a part of the design information submitted with the license application.

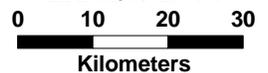
The proposed antenna will not be mounted at the top of a tower which contains a top-mounted platform, and no other antennas will be mounted with horizontal or vertical proximity less than that specified by the manufacturer.

A certification of the mounting and orientation of the antenna from a licensed surveyor, or in states where permitted, a licensed engineer authorized to perform surveying work, will be provided with the license application.



SIMLA

Exhibit B-14



Kilometers

KRFX-FM Denver, CO 4/2003

Exhibit B-16A
Allocation Discussion
KRFX-FM 278C Denver, Colorado

The attached spacing study indicates that there is an apparent 12 kilometer short-spacing between the proposed KRFX facility and a proposal to add a new FM allotment on Channel 279CØ at Akron, Colorado.

It should be noted in this context that on July 29, 2002, the Akron proponent, Akron Broadcasting Company, filed an amendment to their proposal. That amendment proposes to add Channel 279C1 at Akron instead of Channel 279CØ, at coordinates of 40-03-28 NL x 102-57-35 WL. The proposed Akron Channel 279C1 allotment is 198 km from the proposed KRFX operation, representing an apparent 11 km short-spacing.

The Akron proposal (whether Class CØ or Class C1) is also short-spaced to the licensed KRFX facility (a mere 290 meters from the proposed KRFX facility), and was filed under the Commission's Class CØ reclassification procedures, requesting that station KRFX be reclassified as a Class CØ facility since KRFX presently operates at an HAAT of 320 meters. See the Second Report and Order in MM Docket No. 98-93, *1998 Biennial Regulatory Review – Streamlining of Radio Technical Rules in Parts 73 and 74 of the Commission's Rules*, released November 1, 2000.

In the course of that proceeding, the Commission determined that petitions for rulemaking proposing the "forced" Class CØ reclassification of a Class C station will be dismissed upon the filing by the affected station of a construction permit application proposing at least the minimum Class C technical facilities under the new definition:

"[R]eclassification may be initiated only through an original petition for rule making to amend the FM Table of Allotments, and not through comments or counterproposals. Furthermore, to prevent a backlog of petitions contingent on matters in addition to reclassification, such petitions will be dismissed upon the filing, rather than the grant, of an acceptable construction permit application by the subject Class C station." (Second Report and Order at ¶ 28)

On March 4, 2003, the Commission issued an Order to Show Cause to KRFX, allowing an opportunity until April 18, 2003, to file a written statement as to why the license for KRFX should not be modified to a Class CØ facility. On April 18, 2003, KRFX filed a written statement that it would seek to modify the KRFX facilities to an antenna height of at least 451 meters HAAT. The instant application proposes Class C operation of KRFX with 100 kW ERP at 487 meters HAAT, above the new Class C minimum of 451 meters HAAT. Therefore, the Akron proposal is subject to dismissal upon the filing of the instant application, and the apparent short-spacing to the Akron proposal is moot.

Exhibit B-16B
Protection of Table Mountain Radio Receiving Zone
KRFX-FM 278C Denver, Colorado

The requirements of §1.924(b) of the Commission's Rules require that new or changed facilities of FM broadcast stations located in the vicinity of the Table Mountain Radio Receiving Zone of the Research Laboratories of the Department of Commerce located in Boulder County, Colorado, maintain a field strength value of 80 dBu/Vm or less, except as noted in the following table.

The propagation path from the proposed KRFX facilities has been evaluated using a variety of propagation models, and the radiation pattern of the existing authorized antenna has been carefully reviewed. From this data, a specific value of effective radiated power can be determined which would overprotect Table Mountain, but there is at least 2 dB of ambiguity in this analysis. Therefore, a specific directional antenna pattern design for the purpose has not been proposed.

The directional antenna envelope pattern proposed herein shows a reduction below maximum radiation toward Table Mountain. If measurements after construction show that the measured field value at the Table Mountain location exceeds the maximum allowable, the directional antenna feed system has been configured to allow reduction of radiation in the Northeastern row of antenna elements, while at the same time maintaining the radiation within the envelope pattern.

**GRANDFATHERED RADIO/TV STATIONS
TABLE MOUNTAIN MAXIMUM PERMISSIBLE MEASURED SIGNAL LEVELS**

Call Sign	Frequency	Location	Mean		Maximum*	
			mV/m	dBuV/m	mV/m	dBuV/m
KLMO-FM	1060 kHz	Longmont	61.13	95.73	72.66	97.23
KRKS-FM	94.7 MHz	Boulder	16.30	84.24	18.99	85.57
KOSI-FM	101.1 MHz	Lookout Mtn	16.30	84.24	19.37	85.74
KRFX-FM	103.5 MHz	Lookout Mtn	12.90	82.21	15.33	83.71
KQKS-FM	104.3 MHz	Longmont	37.88	91.57	45.02	93.07
KBPI-FM	106.7 MHz	Lookout Mtn	22.40	87.00	26.62	88.50
KCNC-TV	67.25 MHz	Lookout Mtn	13.46	82.58	16.00	84.08
KRMA-TV	83.25 MHz	Lookout Mtn	10.30	80.26	12.24	81.76
KMGH-TV	175.25 MHz	Lookout Mtn	44.07	92.88	52.37	94.38
KUSA-TV	187.25 MHz	Lookout Mtn	43.58	92.79	51.79	94.28

*Maximum is mean times 1.5 dB

Exhibit B-17
NIER Analysis for:
KFMD-FM 239C Denver, Colorado
KRFX-FM 278C Denver, Colorado
KALC-FM 290C Denver, Colorado
KBPI-FM 294C Denver, Colorado

Facilities Proposed

The following ground-level NIER analysis pertains to facilities change applications being filed by four FM stations operating from the Lookout Mountain transmitter site.

The proposed KFMD operation will be on Channel 239C (95.7 MHz) with a maximum lobe effective radiated power of 100 kilowatts. Operation is proposed with an 8-level circularly-polarized directional panel antenna (0.75 wavelength spacing at the KFMD frequency) to be shared with KRFX. The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1033691.

The proposed KRFX operation will be on Channel 278C (103.5 MHz) with a maximum lobe effective radiated power of 100 kilowatts. Operation is proposed with an 8-level circularly-polarized directional panel antenna (0.81 wavelength spacing at the KRFX frequency) to be shared with KFMD. The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1033691.

The proposed KALC operation will be on Channel 290C (105.9 MHz) with an effective radiated power of 100 kilowatts. Operation is proposed with a 6-element circularly-polarized omni-directional antenna (0.87 wavelength spacing at the KALC frequency) to be shared with KBPI. The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1044149.

The proposed KBPI operation will be on Channel 294C (106.7 MHz) with an effective radiated power of 100 kilowatts. Operation is proposed with a 6-element circularly-polarized omni-directional antenna (0.88 wavelength spacing at the KBPI frequency) to be shared with KALC. The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1044149.

NIER Considerations

Several of the FM stations licensed with transmitter locations on Lookout Mountain have operated with Special Temporary Authority at reduced power for the last several months due to isolated instances where measurements of non-ionizing radiation density have exceeded the Commission's environmental threshold levels for general public exposure (47CFR1.1310). One of the underlying purposes of this group of concurrent applications for facilities changes for KFMD, KRFX, KALC, and KBPI is to provide antenna installations which sharply reduce ground-level non-ionizing radiation density levels. This has been accomplished by careful selection of horizontal plane and vertical radiation patterns, using antenna systems with reduced vertical interbay spacings. The implementation of Advanced Digital Television service by the television stations located on the site used by KALC and KBPI (which is owned by Tribune Corporation, licensee of KWGN-TV) has also resulted in antenna system changes by KWGN-TV, K33DN, and K57BT.

K33DN holds a construction permit to change to Channel 48 at a transmitter site 32 km from Lookout Mountain, and has filed an application to locate the Channel 48 operation at a transmitter site 12 km from Lookout Mountain. Therefore, since the instant NIER analysis has been made based on the "final configuration" of station changes at this transmitter site, K33DN has been excluded from this analysis. Additional broadcast stations operating from transmitter sites in excess of 1000 feet from the proposed FM operations are sufficiently distant that the operation of those additional stations have negligible impact on the ground-level NIER levels in the vicinity of the FM towers, and those stations are therefore excluded from this analysis.

The resulting analysis is shown below. All of the antennas, antenna locations, effective radiated powers and other technical details assume the final post-construction facilities for all those stations which are proposed to be modified. Therefore it is anticipated that the Media Bureau will wish to issue specific Special Temporary Authority grants to each station to facilitate the construction process and for the “program test authority,” conditioned on actual measurement of ground level NIER values, and requiring reduced power operation if necessary until all changes have been accomplished and measurements confirm the reduction of levels to below the public standard in all publicly accessible areas.

The analysis below uses as its geographic database a digitized survey of the area surrounding the KFMD/KRFX antenna site, showing buildings, towers, surface features, and topography at 5 foot intervals. The assumptions and caveats recommended by OET-65 as revised have been employed in the analysis. As a calibration technique, existing antenna operations were modeled in the same fashion, and the results compared well with the measured values of NIER shown in the reports “Baseline RF Exposure Measurements Taken March 4, 2002, Lookout Mountain, Vicinity of KWGN-TV and KFMD Broadcast Towers” and “Electromagnetic Field Measurements at Publicly Accessible Areas near the KHIH-FM Tower Site on Lookout Mountain, Colorado” dated April 19, 2000².

According to this analysis, no location is predicted to have a maximum combined exposure (spatially averaged) of more than 36% of the uncontrolled environment standard.

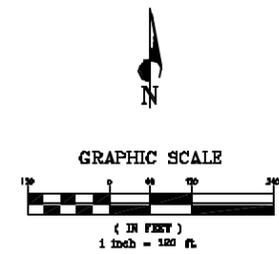
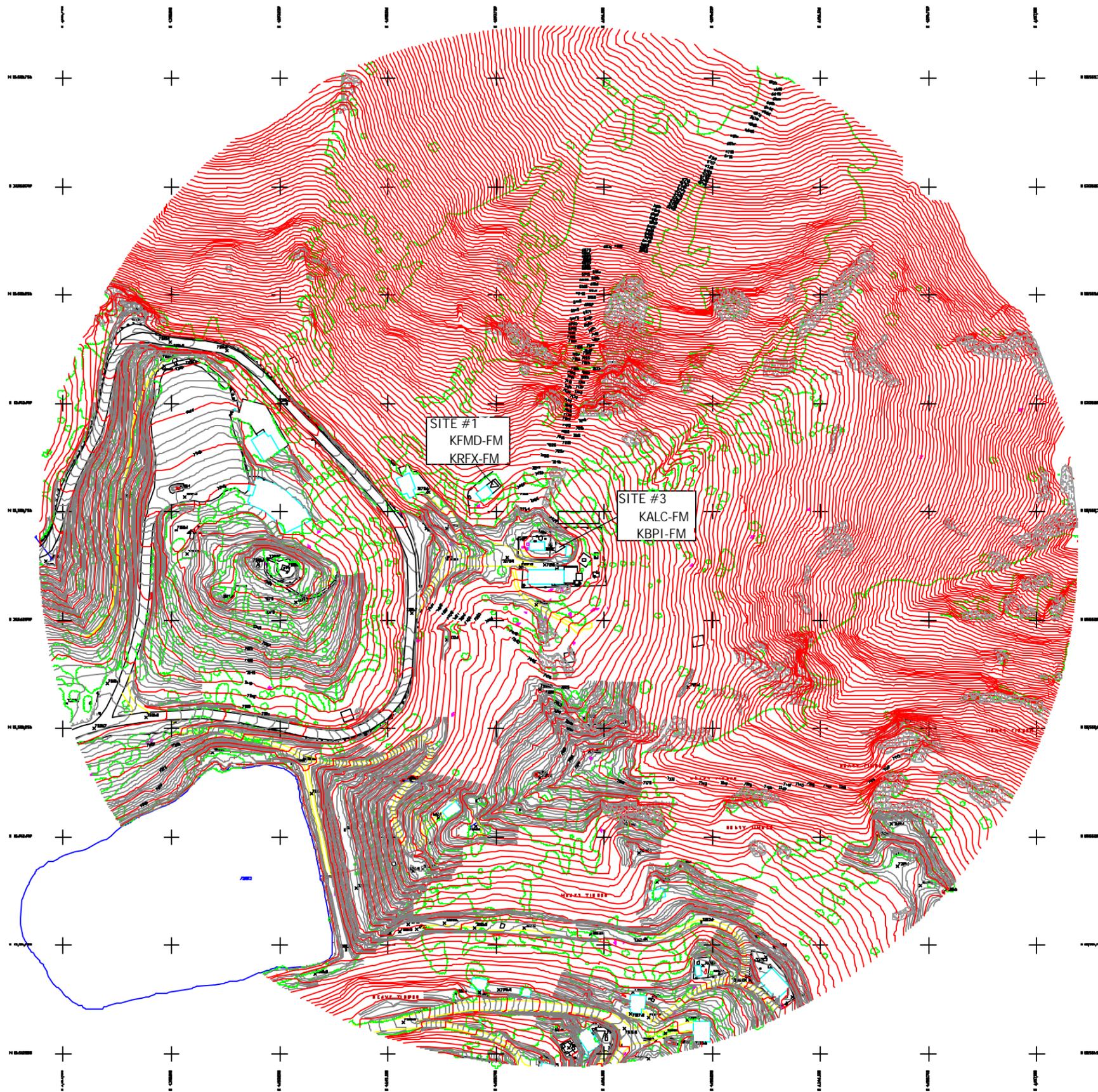
Public access to the tower sites is restricted and the antenna towers are posted with warning signs. Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any tower maintenance work is undertaken.

²The call letters of station KHIH-FM are now KFMD-FM.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.

TABLE OF INDIVIDUAL STATION MAXIMA						
STATION	FREQ. (MHz)	X(m)	Y(m)	PEAK(%)	S.A.(%)	%@BASE OF TOWER
KFMD DA	95.700	20.0	-35.0	11.691	10.908	6.455
KRFX DA	103.500	10.0	-20.0	13.932	13.372	7.058
KALC ND	105.900	45.6	-43.8	3.896	3.795	3.534
KBPI ND	106.700	45.6	-43.8	4.067	3.961	3.690
KWGN-TV	55.250	-25.0	-45.0	0.232	0.228	0.016
KCEC-TV	687.250	55.0	-45.0	11.700	11.117	4.813
K57BT	729.260	50.0	-40.0	14.009	12.567	2.154
KTFD-LP	645.260	85.0	-55.0	0.259	0.238	0.003
MAXIMUM EXPOSURE		50.0	-50.0		35.700	

TOPOGRAPHIC SURVEY



REVISIONS:

PROFESSIONAL LAND SURVEYORS
 12860 W. CEDAR DR. ST. 200A, LAKEWOOD, CO 80228
 PHONE (303) 984-7655 FAX (303) 984-7656

G310039.DWG

Drawn L.F.F.

Check P.C.M.

Scale 1"=120'

TOPOGRAPHIC SURVEY

KHH RADIO
 JEFF GULICK
 LOOK OUT MOUNTAIN ROAD
 303-713-8840

Job No. G310039

Date: 10-06-00

SHEET 1 OF 1

Statement of Engineer

This Engineering Report, which is part of an application for facilities changes for FM station KRFX at Denver, Colorado, has been prepared by the undersigned. All representations contained herein are true to the best of my knowledge. I am a staff engineer in the firm of Hatfield and Dawson Consulting Engineers, and am enrolled as an EIT in the State of Washington.

Signed this 23rd day of April, 2003.

/S/

Erik C. Swanson